

## REMARKS

The Applicant has received and fully considered the rejections received in the March 18, 2008 Office Action. In the Office Action Claim 17 was rejected under 35 USC 112 as being indefinite. Specifically, Claim 17 is a method claim and was dependent upon an apparatus claim. Claim 17 has been amended to be an independent claim. As such, the Applicant respectfully requests the rejection of Claim 17 under 35 USC 112 be withdrawn.

Claims 15-17 are rejected under 35 USC 102(b) as being anticipated by Hamanaka (U.S. Patent No. 5,624,219).

Claim 15 has been amended to be independent of Claim 1, and includes the feature that the female screw-thread is formed using “a fluteless tap comprising a threaded portion with a symmetrical triangular form thread, wherein the symmetrical triangular form thread has an angle of thread in the range 29°-40° and radiussed crests”.

Claims 16 and 17 have been amended such that they are both now independent of Claim 1, and both include the method step of “forming a fluteless tap comprising a threaded portion with a symmetrical triangular form thread, wherein the symmetrical triangular form thread has an angle of thread in the range 29°-40° and radiussed crests”.

Hamanaka fails to explicitly or implicitly disclose that a female screw-thread is formed using such a fluteless tap. Accordingly, the female thread of Claims 15-17, formed using a fluteless tap, will be different to the female thread of Hamanaka.

In particular, Hamanaka states that the nut 40 has an internal thread 400 of which the angle between opposing flanks is 60°. Clearly a female screw-thread formed using a fluteless tap with a thread angle in the range 29°-40° would not have such a large thread angle.

In view of the foregoing reasons the Applicant respectfully requests the rejection of Claims 15-17 under 35 USC 102(b) be withdrawn.

Claims 1-4, 7, 11, 13, 14, 18 and 20 are rejected under 35 USC 103(a) as being unpatentable over Budd (U.S. Patent No. 3,258,797) in view of Neuhengen (U.S. Patent No. 6,702,537).

Claim 1 was rejected under 35 USC 103(a) as being unpatentable over Budd in view of Neuhengen.

The Examiner suggests that Budd discloses radiussed crests of 0.005 inches. He suggests that this is disclosed on patent at column 2 lines 49-50. This part of the patent reads "it should be noted that it is common practice when forming swagging taps to relieve the non-working threaded portion by as much as 0.005 inches which would mean that the end of the threaded body adjacent the shank could be tapered slightly by the aforementioned amount". The reference to 0.005 inches refers to a tapering of the end of the threaded body nearest the shank and not to a provision of radiussed crests. Indeed, throughout the Figures 1, 2, 3, 6, 12, 13 and 14 of Budd it can be seen that the crests of the tap are all sharp-edged crests rather than radiussed crests. The Examiner is kindly requested to compare, for instance, Figure 3 of Budd and Figure 1 of the current application. The Examiner will see in Figure 1 of the current application that the crests 11 are all rounded, i.e. radiussed, whereas the crests in Budd are all sharp-edged pointed crests.

The Examiner has referred us to the Acme form thread and enclosed herewith are some pages giving details of Acme threads. The citing on Acme thread by the Examiner is very relevant since an Acme thread is a translational thread of the type described in the patent specification in its preamble. It is a trapezoidal thread and is often used for lead screws. In contrast to the Acme thread, the present invention concerns a triangular form thread instead of the trapezoidal form thread of an Acme thread. In the past it has been accepted that it is best practice to use a trapezoidal thread for the translational screw thread, but the invention has realised that the taps needed to create trapezoidal female screw threads are expensive and wear

quickly and have a long cycle time. The taps needed for trapezoidal thread are necessarily fluted in nature, whereas the tap claimed by the present invention is flute-less.

The tap of Budd is not explicitly disclosed as a tap for forming a translational screw thread. Indeed, it is unlikely that the tap would be used for a translational screw thread and would simply be used for tapping a screw thread for engagement by a fastener. The performance of a screw thread formed by the tap of Budd would not be appropriate lead screw operation.

The Examiner has also referred us to Onasch *et al.* (U.S. Patent No. 4,527,932). Again, this is not a tap designed for the creation of a translation thread form, but instead relates to "self-tapping or thread forming screws" (see column 1 lines 6 and 7). Therefore, Neuhengen does not relate to a tap at all, but to a screw. This is important because a tap must be designed for repeated use and is an important feature is the present invention that the taps design features allow it to be used over many cycles to produce a translational thread. Thus, the skilled man would not think that the teaching of a chamfered front end for a self-tapping screw would necessarily be applicable to a tap which needs to be used repeatedly.

Claim 1 has been amended to make clear that the triangular form used in the tap is a symmetrical form, whereas Neuhengen discloses the use of an asymmetrical triangular form as can be seen Figure 2.

With reference to Claims 5 and 6, the Examiner has cited Sawabe *et al.* (European Patent No. 1134051) in addition to Budd and Neuhengen. Claims 5 and 6 depend indirectly from Claim 1. As such the foregoing reasons and arguments would also apply as to the allowability of Claims 5 and 6.

Referring now to Claims 8-10, the Examiner makes reference to Onasch. The Examiner suggests that Onasch *et al.* discloses radiussed crests, but if a man skilled in the art looks at

Figure 2 of Onasch he will find that the crests 5 are flats and therefore the thread form is trapezoidal in nature rather than triangular.

The invention of Onasch relates to a "self-tapping" screw in particular to wood screws (see column 1 lines 1 to 4). The man skilled in the art would not think that the form used for a self-tapping screw would be appropriate for a tap. This is because a self-tapping screw typically has to form a thread only once and at a slow pace, whereas the tap of the present invention will be used repeatedly and also at high speeds, to give a low cycle time and efficient manufacturing.

In Onasch we are told that the radius 13, which is the smallest radius of curvature and the radius of curvature applicable to the root, should be  $0.135 \times$  the outer diameter (column 3 lines 1 and 2). Looking at Figure 2 of the current application it will be seen that the outer diameter can be calculated as  $6.97 + (6.97 - 5.70) = 8.24\text{mm}$ . Applying the ratio suggested by Onasch gives  $0.135 \times 8.24 = 1.1124\text{mm}$ . This compares with a claimed radius of curvature in Claim 10 of  $0.178\text{mm}$  to  $0.188\text{mm}$  (i.e. applying the formula of Onasch gives a radius of the root which is a factor of 10 out).

Finally, in relation to Claim 12, the Examiner suggests that it would be obvious to take a groove as in Thurston (U.S. Patent No. 3,492,908) and apply it to Budd in view of Neuhengen. However, as mentioned above, Neuhengen relates to a self-tapping screw rather than a tap and it would be highly unusual to apply a lubrication groove to a self-tapping screw, which is most often designed for one-use operation and not for repeated operation like a tap. Whilst lubrication is significant for a tap, the skilled man would not think it appropriate for the self-tapping screws of Neuhengen or Onasch.

The Examiner is respectfully requested to reconsider the application in the light of the amendments made and the arguments we have submitted.

Enclosed is a Petition and Fee for a Two-Month Extension of Time. Please charge Deposit Account No. 50-1971 the amount of \$230.00 to cover this extension of time fee. Further, charge any additional fees required by this paper or credit any overpayment to Deposit Account No. 50-1971.

Should any other amendments be necessary to place the application in condition for a Notice of Allowance, Examiner Tolan is invited to call the undersigned at the below noted telephone number.

Respectfully submitted,



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